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EP 0798651 A2   US 6151493 A
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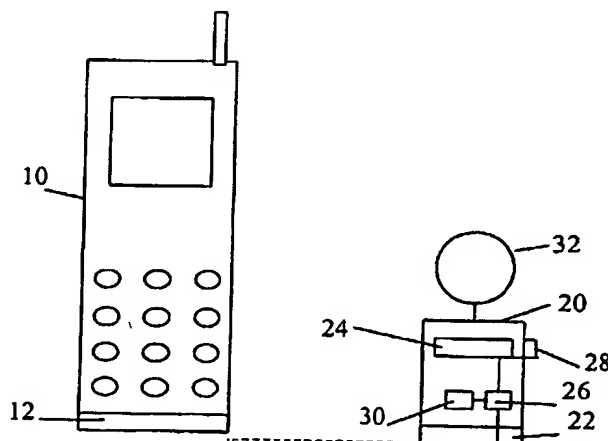Other: ONLINE: WPI, EPODOC, JAPIO, TDB, INSPEC

(54) Abstract Title
A combination of a portable data storage device and a wireless backup device having an out of range alert

(57)   A method of safeguarding against loss of data stored in a portable data storage device 10 or loss of the data storage device itself is described. A user-carried backup device 20 having memory 24 and a wireless communication link 22 for communicating with the portable data storage device 10 is provided. The backup device 20 and the portable data storage device 10 communicate periodically or quasi-continuously over the wireless communication link and may backup data entered into the portable data storage device 10 and check for removal of the portable data storage device 10. An alarm 30 is activated to alert a user to loss of the portable data storage device if the portable data storage device is out of range of communication for a predetermined period.

The portable data storage device 10 may be a Bluetooth (RTM) enabled mobile phone whilst the backup device 20 may be a PDA (personal digital assistant) but preferably has limited functionality and can be worn by a user e.g. on a wrist strap or keyring or as an article of smart clothing.

Fig. 1

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Fig. 1

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12
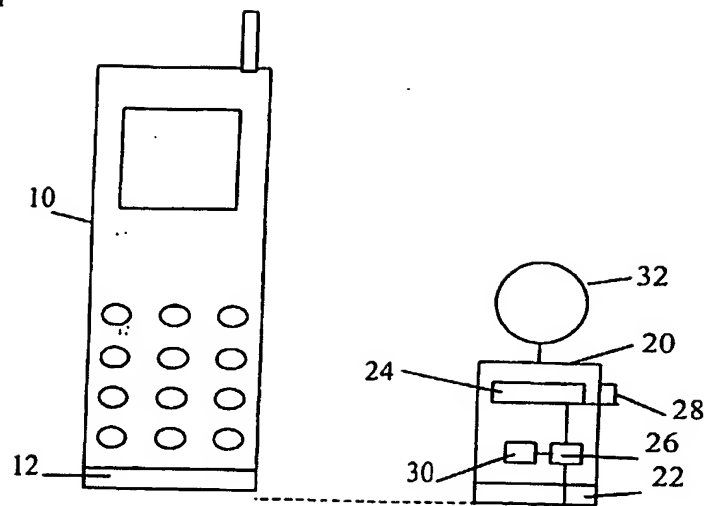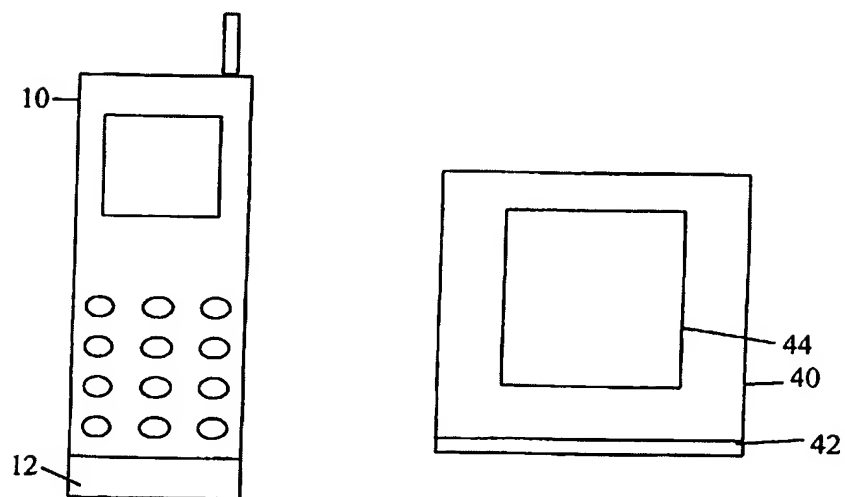
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Fig. 2

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Data Security Device

The present invention is concerned with the security of data stored on portable data storage devices, particularly, but not exclusively devices such as

5   hand-held organisers or PDA devices or mobile telephones, most particularly mobile telephones.

In recent years, there has been a widespread increase in the usage of small portable devices for the storage of important data such as contact and calender

10   information. Devices have become much more user-friendly, much smaller and much more powerful increasing the number of applications for such devices and the usefulness of such devices. The increasing portability and power of such devices has had many benefits but has one drawback, namely that it is easy to mislay or lose a device containing large amounts of useful data.

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The risk of loss or damage has been appreciated and many devices are provided with the facility to backup data onto another device, such as a desktop or other computer. Often this involves making a physical connection using a cable although devices with IrDa (infra-red) communication interfaces are available. The

20   backup process, however it is implemented, normally requires positive intervention on the part of the user and can be labourious. As a result, data on portable devices may not be backed up very frequently. Thus, even a user of above average diligence in backing up the data is liable to lose a significant amount of useful data in the event of loss of the device.

25

The present invention aims generally to address the problem of reducing the risk of loss of data stored in a portable data device, particularly a mobile telephone.

In a first aspect, the invention provides a method of safeguarding against loss

30   of data stored in a portable data storage device, the method comprising providing a backup device having memory and a wireless communication link for communicating with the portable data storage device;

communicating over the wireless communication link with the portable data storage device to backup data entered into the portable data storage device;

signalling an alarm if the portable data storage device is out of range of communication.

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In this way, the backup device contains data (or selected data) stored in the portable storage device and so, if the device is lost, the backup data can be retrieved. Furthermore, if the device is moved out of range, an alarm is sounded so that the user is alerted that they have left the portable storage device behind. The

10 alarm is preferably provided by the backup device, preferably as at least an audible (and/or vibrating) alarm. However, an alarm may be provided additionally or alternatively by the portable data storage device.

Thus, embodiments of the invention may both avoid the need for regular

15 manual backup and reduce the risk of loss of the device in the first place. The solution provided by the invention effectively reduces both the risk of loss of the device and the risk of loss of data even if the device is lost, most conveniently using a single communication link to achieve both functions. Although detection of the devices being out of range may be conveniently achieved by detecting breakdown

20 of the communication link, this detection may be supplemented or substituted by a further ranging function, for example if a more precise specification of range is required or if an early warning of the limits of the range being exceeded is desired while a communication link still exists.

25 The communication link is preferably a short-range link. It will be appreciated that the effective range need not be precisely defined and in practice will vary depending on ambient conditions but should be set so that the communication link breaks down at a separation distance between the two devices consistent with the user having left the data storage device behind. Typically, this distance will be of

30 the order of 10 metres but smaller or greater distances may be employed depending on the application. The distance may be selectable by the user. For example, if the user wishes to be alerted to possible theft of the device in a crowded

place such as on public transport, a separation distance of the order of 1 metre or possibly even less may be appropriate to trigger the alert. If a user is working in a large open-plan office space and is happy to leave the data device in the office but wishes to be alerted to having left it behind when he leaves the building, a distance

5   of 50 metres or even 100 metres may be appropriate.

Most preferably, the communication link is a wireless radio link and most preferably, the link is a Bluetooth (or similar) radio link. Bluetooth operates at approximately 2.4GHz and provides secure communication between devices up to

10   distances of the order of 10 metres, which is ideal for the present application. However, other forms of radio link may be used, for example a 415MHz low power transceiver link, as used, for example, for remote control alarm keys and the like. The latter also has the advantage that low-cost compact transceivers are readily available.   An advantage of using higher frequencies is that more compact

15   transceivers can be employed whilst still having relatively efficient antenna for the radio transceiver.   Nevertheless, in view of the short communication distances required, as will be appreciated, any of a variety of available frequencies may be used.

20   The wireless link need not use radio; for example, an ultrasonic link may be employed in certain cases. In certain cases, a contact based link may be employed, for example based on transmission of data by coupling to a user's body.

Preferably, the method includes receiving a user input to cancel an alert.

25   This enables a user to keep the backup device with them and not be constantly alerted to having (deliberately) left their data storage device elsewhere.

In a most preferred application, the data storage device is configured so as to be at least partially inoperable in the absence of communication with the backup

30   device. The data storage device may be configured so as to become partially or completely disabled if communication from the backup device has not been received within a predetermined time period. The partial or total disabling of the device may

be over-rideable by a user, either by disarming the disabling feature in advance of the portable data storage device going out of range or by entry of an appropriate password or pin number into the data storage device. Disablement may be temporary so that functionality of the device is resumed when communication is
5   reestablished. This may enable a user to leave a mobile telephone which is inoperable unless the user, with the backup device, is within range. Partial disablement may, particularly in the case of a mobile telephone, include access to only certain functions. For example, if a mobile telephone is out of range of the backup device, use may be restricted to dialling a number to report the phone as
10   lost or to receive delivery of the user information for returning the phone.

A convenient way both of securing data and preventing unauthorised access to a mobile telephone (or similar device) may be to have a SIM card (or equivalent data storage device) for the mobile telephone provided in the backup device. In that
15   way, when the backup device and mobile telephone are separated, the telephone is unusable and furthermore, the data in the SIM card is inherently secured. This may also enable the backup device to be used with devices such as "disposable" mobile telephones. These features may be provided independently. A further aspect provides a mobile telephone having a (short range) wireless link to a remote
20   device containing SIM card data for the mobile telephone.

As used herein, the term mobile telephone is intended to encompass devices which are capable of text or data or graphic or video communication as well as or instead of voice communication, where the context so requires.
25
It has been appreciated by the inventors that the requirement for the backup device to have memory and a communication device may in fact be satisfied by another portable data storage device, such as a PDA. Thus, it is possible to implement the backup device as an application for another portable data
30   communication device, such as a PDA.

In a development, it is possible for two (or more) portable data storage

devices to be used to perform mutual backup and security functions for each other. It is greatly preferred, however, if the backup device is <u>not</u> a fully functional data storage device but has limited or no user input and output functions. Surprisingly, therefore, it is advantageous for the device to be provided with little functionality.

5   Pursuant to the invention it has been appreciated that the backup device must be compact if it is to be carried with the user, which limits the user input and output interfaces which can usefully be provided. Furthermore, if the device has limited functionality, it is less likely that the user will use (and therefore possibly lose) the backup device itself. In preferred implementations, the backup device is compact

10   and provided as a device which may be readily carried with the user, such as a credit-card sized device, a watch or watch insert, a key-ring or a clip-on device which can securely clip to a user or to an article of clothing. The backup device may have means for attaching securely but preferably removably (optionally permanently) to a person or to an article of clothing, such as a wrist strap, a clip, a belt clip, a pin or

15   safety pin, a Velcro™ fastener, a tie clip, a self-adhesive pad or any other suitable fastening.

The backup device can, using current technology, be made very compact as it need only include a communication device, such as a Bluetooth chip (which may

20   be smaller than a postage stamp), some (flash) memory, limited processing power and a power source. All of these functions can readily be integrated into a small device, so small in fact that the backup device itself may be easy to misplace, which is why it is desirable for it to be securely attachable to clothing or integrated into another form of housing which the user is likely to use.

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Preferably, the backup device is integrated into a housing which has functionality other than as a data storage device, for example as a key-ring, a credit-card, a watch or the like, as noted above.

30   The invention extends to apparatus embodying the invention, to a computer program or computer program product or signal embodying the method, to a data storage device configured to operate with such a backup device.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings in which:-

Fig. 1 shows a system in accordance with a first embodiment;

5   Fig. 2 shows a system in accordance with a second embodiment;

Referring to Fig. 1, a portable data storage device 10, in this embodiment in the form of a mobile telephone, includes a short-range wireless communication interface 12, in this embodiment in the form of a BlueTooth™ transceiver chip.
10   Although the transceiver is shown visible at the base of the device, typically it may be integrated within the device, or provided as an additional component integrated with a battery for the device or within the battery housing. The device 10 stores contact details and optionally appointments or other data within the body of the device or on a SIM card provided with the device and a processor within the device
15   10 communicates with the communication interface.

A backup device 20 has a short-range wireless communication interface 22, in this embodiment in the form of a BlueTooth™ transceiver chip. An internal or external antenna may be provided, optionally on a circuit board. The backup device
20   includes backup data storage 24, for example FLASH memory. The amount of memory may be as little as 1Kb, for example to backup only key data but will typically be at least 64 Kbytes. Often considerably more memory, for example of the order of 1Mb to 10Mb and sometimes as much as 128Mb or even more may be provided, depending on the capacity of the device 10. A processor 26 controls the
25   operation of the backup device, specifically controlling communication via the interface 22 and storage of data, and also receives a user input 28 and controls an alarm device 30, for example a piezo electric sounder. A battery (not shown) is also provided within the housing (although the device may in some cases be powered by the transmissions from the portable data storage device). The alarm device may
30   include a visible alert or a vibrating alert device. The user input 28 is preferably a simple input device, for example a single input button or a few buttons. A useful minimum function to implement with the user input device is cancelling of an alarm;

other functions may be implemented by controlling the device via the communication interface. However, a more complex user interface may be provided, for example a voice recognition interface. The user interface may be omitted entirely; in such a case the alarm is preferably arranged to silence automatically after a predetermined
5   time.

The backup device is provided in a convenient housing, here in the form of a key fob having a key ring 32 attached so that the device can conveniently be carried and is unlikely to be lost.
10

The device 20 may be attachable to or woven into an article of clothing. Alternatively or additionally, the device 20 may be integrated with or arranged to communicate with an item of "smart" clothing, that is clothing with some processing and memory function built in and optionally some human interface. The device may
15   be provided as an application for an article of "smart" clothing.

In operation, software, for example stored within the main body of the portable data storage device 10, in the communication interface or on the SIM card, causes the processor of the portable data storage device to communicate with the
20   communication interface to operate a data synchronisation algorithm over the interface with the backup device 20. Data synchronisation algorithms are well-known; in the present case a simplified, predominantly one-way, synchronisation algorithm may be employed as the data will not be changed by the backup device. Thus synchronisation may simply comprise updating the backup device with the
25   contents of the portable data storage device at intervals, unless a "restore" sequence is invoked.

A single backup device may be employed to backup data, or detect loss, of more than one portable data storage device 10, for example a mobile telephone and
30   a PDA may both be backed up to the same backup device. Furthermore, in such a case the data backed up may be independently stored or mutual synchronisation between all such devices may be performed for some or all of the data. For

example, a PDA may back up contact, appointment and memo data and a mobile phone may back up only telephone number data; the telephone number data may be synchronised between the devices, or may be stored independently on the backup device.

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The backup device may include other functionality, for example it may communicate with another network, for example a network for communicating positional information such as Geo Fencing application network. In such a case, the backup device may provide some of the functionality which might otherwise (or

10 aditionally) be provided by the portable data storage device. In particular, a user's position may be communicated using the backup device alone, for example if the portable data storage device is switched off.

The backup device may also be used in conjunction with a telemetry or

15 telematics application, for example in which information is gathered by the device using the communication interface from other devices which pass into communication and is communicated to a central server.

The backup device may include yet other functionality, for example it may act

20 as a key to a lock or alarm (for example for a vehicle, workplace or residence, other computing device or other resource); this may be achieved efficiently by making use of the communication interface. The device may include other "smartcard" functionality, optionally over the communication interface.

25   Referring to Fig. 2, an alternative embodiment provides the functionality of the backup device in a further portable data storage device 40, such as a handheld organiser. The further device 40 has a further communication interface 42, such as a BlueTooth interface and has a touch screen for user input and output. The device 40 also includes a sounder, a processor and storage for data and for at least one

30 application program, not shown. An application is downloaded to the portable data storage device 40 to communicate with the portable data storage device 10 and to provide a data synchronisation function. If the communication link is broken, an

alert is sounded, preferably on both devices 10, 40. Furthermore, in the absence of a communication link, preferably at least one function of at least one device is inhibited or the device is switched into a "lost" mode displaying owner contact data.

5

The following pseudo code explains the normal operation of the system:-

Portable Data Storage Device 10
    Every [period, e.g. 1 second]:-
10   *Attempt communication with backup device 20*
        If successful, transmit update information if required
        If unsuccessful activate PDS Alert procedure:-

Backup Device 20
15   *Every [period, e.g. 1 second]:-*
        Attempt communication with PDS device 10
        If successful, receive update information if required
        If unsuccessful, sound alarm for period or until cancelled

20 A typical PDSAlert procedure for the Device 10 may comprise:-
        Sound alarm for set period
        Display "lost"
        Disable calls except to designated retrieval number

25 In addition, procedures are provided:-
    (1) To register the backup and portable data storage devices with each other
    (2) To transfer data from the backup device to the portable data storage device or
    to a replacement portable data storage device following loss of data.

30   The above description is provided by way of example only and modifications of detail may be provided.

Claims

1.   A method of safeguarding against loss of data stored in a portable data storage device, the method comprising providing a backup device having memory
5   and a wireless communication link for communicating with the portable data storage device;

communicating between the backup device and the portable data storage device over the wireless communication link to backup data entered into the portable data storage device;

10   signalling an alarm if the portable data storage device is out of range of communication.

2.   A method according to Claim 1, wherein said wireless communication link is a short range link, preferably having an effective range of about 100m or
15   less, more preferably about 10m or less.

3.   A method according to Claim 1, wherein said wireless communication link is a BlueTooth link.

20 4.   A method according to any preceding claim, wherein communication occurs periodically.

5.   A method according to any preceding claim wherein communication occurs quasi-continuously.

25

6.   A method according to any preceding claim wherein an alarm is signalled in the event that communication is interrupted for a predetermined period.

7.   A method according to Claim 6 wherein an alarm is signalled in the event of
30   interruption of about one second or more.

8.   A method according to any preceding claim, further comprising receiving a

user input to disable the alarm.

9. A method according to Claim 8, wherein a user input to disable the alarm is provided prior to the alarm being activated.

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10. A method according to Claim 8 or 9, wherein a user input to disable the alarm is provided after the alarm has been activated.

11. A method according to any preceding claim, further comprising inhibiting
10 operation of the portable data storage device in the absence of communication with the backup device.

12. A method according to Claim 11 wherein inhibiting comprises disabling some but not all functions of the portable data storage device.

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13. A method according to Claim 12, wherein the portable data storage device is a mobile telephone and, during inhibiting, access is enabled to at least one predetermined number but inhibited to other numbers.

20 14. A method according to any preceding claim wherein data is backed up in response to entering of new data into the portable data storage device.

15. A method according to any preceding claim wherein data is backed up periodically.

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16. A method according to any preceding claim including communicating data stored in the backup device to another device via a machine interface, preferably said wireless communication link.

30 17. A method according to any preceding claim wherein data stored in the backup device is accessible by another data storage device via a machine interface, preferably said wireless communication link.

18. A method according to Claim 17, wherein data stored in the backup device is not all directly accessible via a human interface.

5 19. A method according to any preceding claim, further comprising registering the backup device with the portable data storage device.

20. A method according to any preceding claim further comprising communicating between the backup device and a network.

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21. A method according to Claim 20, wherein the network is a network providing position information.

22. A method of operating a portable data storage device, the method
15 comprising:

periodically communicating with a backup device over a wireless communication link to backup data stored in the portable data storage device.

23. A method according to Claim 22, further comprising triggering an alert
20 procedure when the backup device is out of range.

24. A method according to Claim 23 wherein an alert is sounded on the portable data storage device.

25 25. A method according to Claim 23 or 24 wherein the alert procedure comprises disabling at least one function of the portable data storage device.

26. A method of operating a backup device, the method comprising periodically communicating with a portable data storage device over a wireless
30 communication link to backup data stored in the portable data storage device; and triggering an alert procedure when the portable data storage device is out of range.

27. A method according to Claim 26, further comprising communicating data stored in the backup device to restore data to the portable data storage device or to a replacement portable data storage device.

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28. A method according to Claim 26 or 27, further comprising communicating with a network.

29. A method according to any of Claims 22 to 28, further comprising receiving

10   a user input to cancel the alert procedure.

30. A computer program or computer program product containing instructions to cause a portable data storage device or a backup device to operate in accordance with a method according to any preceding claim.

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31. A computer program or computer program product according to Claim 30 comprising a downloadable application for a portable data storage device.

32. A computer program or computer program product according to Claim 30

20   comprising a program stored with an interface for communicating via the wireless communication link.

33. A signal, particularly a SIM card update, comprising software to cause a portable data storage device to operate in accordance with a method

25   according to any of Claims 1 to 25.

34. A portable data storage device having a short range wireless communication interface and configured to communicate with a backup device over the wireless communication link.

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35. A backup device comprising:
a short-range wireless communication link;

means for communicating with a portable data storage device over the communication link to receive data to backup;

storage for storing data received; and

means for sounding an alarm when the portable data storage device is out

5 of range.

36. A backup device substantially as herein described.

37. An application for a portable data storage device comprising:

10 means for periodically communicating with a backup device over a wireless communicating link to backup data stored in the portable data storage device.

38. A data backup device comprising a wireless communication link for communicating with a portable data storage device and means for backing up data

15 from the portable data storage device, mounted in a housing for mounting on a key-ring, in a wallet, on a watch or attachable to or part of an article of clothing.

39. A data backup device according to Claim 38I, further including an alarm integrated in the housing.

20

40. A backup device having memory for storing data and wireless communication means for communicating with the memory but configured without a user interface for enabling direct input of data into the memory.

25 41. A portable data storage device having means for disabling at least some functions of the portable data storage device in the absence of communication from a backup device.

42. A mobile telephone having a wireless link to a remote device containing SIM

30 card data for the mobile telephone.

43. An application for an article of smart clothing, the smart clothing having

embedded therein a processor, memory and a communication interface, the application comprising instructions for performing a method according to any of Claims 1 to 29.

The Patent Office

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Application No: GB 0117530.6	**Examiner:** Paul Jefferies
Claims searched: 1-29, 34-37	**Date of search:** 13 December 2001

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Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

   UK Cl (Ed.S): G4A (AAP, AMX); H4L (LECCP, LECCX, LEF)

   Int Cl (Ed.7): G06F 1/00,11/14, 12/14, 12/16 ; H04B 1/38; H04Q 7/32

Other: ONLINE: WPI, EPODOC, JAPIO, TDB, INSPEC

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	EP 0798651 A2	(XEROX) See column 2, lines 24-46; column 3, lines 14-28 and figures.	1-4, 26, 35 at least
Y	US20010002211	(LEE) See paragraph [0008] and figure 1.	1-4, 26, 35 at least
Y	US 6151493	(SASAKURA et al.) See column 5, lines 36-43; column 9, lines 8-29 and figure 1.	1-4, 26, 35 at least
X	US 5930703	(CAIRNS) See figures 1, 5 and column 2, lines 4-24; column 5, lines 1-13; column 6, lines 12-26.	1-4, 26, 35 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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